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**8 Engineering a front-end prototype using computing with words in generic BK-product fuzzy relational architectures**

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*Kowalczyk, R.*

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*Turksen, I.B.*

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*Detyniecki, M.; Seyrat, C.; Yager, R.*

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**perceptions***Zadeh, L.A.*

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*Subasic, P.; Huettner, A.*

Fuzzy Systems, IEEE Transactions on , Volume: 9 Issue: 4 , Aug. 2001

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*Subasic, P.; Huettner, A.*

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Computing with words

- Rubin, S.H.

Dept. of Comput. Sci., Central Michigan Univ., Mount Pleasant, MI, USA

*This paper appears in:* Systems, Man and Cybernetics, Part B, IEEE

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On page(s): 518 - 524

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Volume: 29 Issue: 4

ISSN: 1083-4419

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**Abstract:**

Computing with words is defined, in this paper, to be a symbolic generalization of fuzzy logic, which admits self-reference. It entails the randomization of declarative knowledge, which yields procedural knowledge. Such randomization can occur at two levels. First is termed weak randomization, which is essentially a domain-general pattern-matching operation. Second is termed strong randomization, which entails the application of one rule set to the semantics of another-possibly including itself. Strong randomization rests on top of weak randomization. Strong randomization is essentially a heuristic process. It is fully scalable, since it can in theory map out its own needed heuristics for evermore efficient search-including segmentation of the knowledge base. It is proven that strong learning must be knowledge-based, if effective. Computing with words does not preclude the use of predicate functions or procedural attachments. Also, the paradigm for computing with words does not directly compete with that for fuzzy logic. Rather, it serves to augment the utility of fuzzy logic through symbolic randomization. A countably infinite number of domain-specific logics or knowledge-based methods for randomization exist.

**Index Terms:**

fuzzy logic knowledge acquisition randomised algorithms symbolic generalization fuzzy logic randomization declarative knowledge procedural knowledge termed weak randomization domain-general pattern-matching operation strong randomization heuristic process knowledge base symbolic randomization domain-specific logics knowledge-based methods

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